



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/630,746	07/31/2003	Young Chul Lee	LEEY3017/EM	9936

23364 7590 08/08/2006

BACON & THOMAS, PLLC  
625 SLATERS LANE  
FOURTH FLOOR  
ALEXANDRIA, VA 22314

EXAMINER
----------

WATKINS III, WILLIAM P

ART UNIT	PAPER NUMBER
----------	--------------

1772

DATE MAILED: 08/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/630,746	LEE ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	William P. Watkins III	1772	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 17 May 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) 5-10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>1/04/2006</u> . | 6) <input type="checkbox"/> Other: _____  |

Art Unit: 1772

**DETAILED ACTION**

1. The examiner confirms that there is a typographical error in the office action mailed 17 January 2006 and that applicant correctly took the patent number for Yamada et al. as being U.S. 6,784,765 B2.

2. The rejection using Yamada et al. in view of Wakino et al. only has been withdraw and replaced by the rejection previously used for claim 2, that uses Yamada et al. in view of Wakino further in view of Sreeram et al., in view of applicant's arguments and amendments to claim 1, filed 17 May 2006.

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamada et al. (U.S. 6,784,765 B2) in view of

Art Unit: 1772

Wakino et al. (U.S. 4,931,354) further in view of Sreeram et al. (U.S. 5,858,145).

Yamada et al. teaches a multilayer ceramic circuit board with metal pattern conductive layers on different layers that overlap and a thermosetting resin layer between upper and lower metal patterned ceramic layers that has a lower dielectric constant layer than either of the upper or lower ceramic layers in order to provide better isolation of the layers when operating in the RF frequency band (abstract, element 17, col. 1, lines 15-20, col. 2, lines 55-65, Figure 4). Wakino et al. teach using a ceramic layer with porous cavities between upper and lower ceramic layers with circuit patterns in order to provide a low dielectric constant to prevent interaction of the circuit layers (abstract, element 7, Figure 3, col. 4, line 55 through col. 5, line 10). Sreeram et al. teaches the formation of holes in ceramic layers by punching through a green sheet, that may be different shapes that may have diameters, and may form internal or buried cavities (col. 5, lines 20-30, col. 5, line 20 for diameter of hole). The punch forms a hole that extends from one surface of the layer that is punched to the opposite surface of the layer that is punched (Figure 2B). The punched layers are then laminated with non-punched layers that

Art Unit: 1772

may close either or both of the ends of the through holes to form cavities or buried cavities (col. 5, lines 20-30).

The instant invention claims use of cavities in a ceramic layer in vertical alignment with upper and lower circuit patterns on other ceramic layers in a multilayer ceramic substrate in a radio frequency circuit. The cavities extend from the surface on one side of the layer to the surface on the opposite side of the layer. It would have been obvious to one of ordinary skill in the art to have to have used a ceramic middle layer with cavities instead of a thermosetting resin layer to have a lower dielectric constant layer between metal circuit layers in the multilayer substrate of Yamada et al. in order to prevent interaction of the circuits and allow formation of the circuit layers with co-firing and no adhesive step because of the teachings of Wakino et al. It further would have been within the ordinary skill of the art to have used cylindrical through cavities instead of fine pores in the middle low dielectric constant layer of Yamada et al. in view of Wakino et al. in order to form long cavities that allow a larger dielectric constant difference than confined small pores by an alternate process that uses punching instead of burning out an organic substance because of the teaching of Sreeram et al. that

Art Unit: 1772

punching allows the formation of stable long through cavities.

The fine hole diameters of the porous cavity layer of the Wakino et al. are taken as meeting the size limitation of claim 3.

5. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., In re Berg, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); In re Goodman, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); In re Longi, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); In re Van Ornum, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); In re Vogel, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and In re Thorington, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

6. Claims 1-4 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 7-9 of copending Application No.

Art Unit: 1772

10/872,429. Although the conflicting claims are not identical, they are not patentably distinct from each other because the instant claims are broader than the claims of the '429 application and would therefore have been obvious over them. The claims of the '429 application would have been obvious over the instant claims as the specific conductive layer and ceramic structure in the '429 application is conventional as is the need to prevent interaction between the conductive structures. It therefore would have been obvious to one of ordinary skill in the art to have used the instant claimed low dielectric constant ceramic cavity layer in the '429 claim layer configuration.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

7. Claims 1-4 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 7-9 of copending Application No. 11/430,081. Although the conflicting claims are not identical, they are not patentably distinct from each other because the instant claims are broader than the claims of the '081 application and would therefore have been obvious over them.

Art Unit: 1772

The claims of the '081 application would have been obvious over the instant claims as the specific conductive layer and ceramic structure in the '081 application is conventional as is the need to prevent interaction between the conductive structures. It therefore would have been obvious to one of ordinary skill in the art to have used the instant claimed low dielectric constant ceramic cavity layer in the '429 claim layer configuration.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

8. Applicant's arguments filed 17 May 2006 have been fully considered but they are not persuasive.

Applicant argues that Sreeram et al. does not cure the failings of Yamada et al. in view of Wakino et al. in regard to the new language of through holes. The examiner disagrees as Sreeram et al. clearly teaches through hole formation in intermediate layers by punching. A portion of an intermediate layer that is a punched through hole clearly has a dielectric constant that is closer to air and thus has a greater difference in dielectric constant, as compared to the dielectric constant of adjacent solid substrates, than a cross section that is a



Art Unit: 1772

mixture of pores and solid portions as in Wakino et al. A punched through hole and motivation to use that through hole in an intermediate layer in a ceramic RF module are thus provided by the combination of the above rejection.

The double patenting rejection against the '429 application is maintained as the article claims are still pending at the time of the preparation of the instant office action. A new rejection has been provided against similar article claims in the newly filed divisional of the '429 application. The examiner notes that in the event the instant method claims are rejoined in the absence of an art rejection, there may be double patenting issues with the method claims of the '429 application.

9. This application contains claims 5-10 drawn to an invention nonelected with traverse in the paper filed 10 January 2005. A complete reply to the final rejection must include cancellation of nonelected claims 5-10 or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

Applicant is required to cancel claims 5-10, petition as to the proper nature of the restriction requirement (which has been made final in the office action mailed 08 February 2005), or conform claims 5-10 to the scope of claim 1, so that they may be

Art Unit: 1772

rejoined in the event claim 1 is found to be allowable. The examiner notes that claim 10 already conforms to the scope of claim 1.

10. Applicant's amendment and recent action of filing a related divisional case necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to William

Art Unit: 1772

P. Watkins III whose telephone number is 571-272-1503. The examiner works an increased flex time schedule, but can normally be reached Monday through Friday, 11:30 A.M. through 8:00 P.M. Eastern Time. The examiner returns all calls within one business day unless an extended absence is noted on his voice mail greeting.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Pyon can be reached on 571-272-1498. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



WILLIAM P. WATKINS III  
PRIMARY EXAMINER

WW/ww

August 5, 2006